

Description of the Session 6: Using public recording space

In this session, participants will first have a conversation about a CCA from last session focused on analyzing fraction comparison problems. Session 6 introduces the idea of planning for and learning from the use of public recording space. “Public recording space” refers to the collection of “technologies” and physical spaces that can be used in the classroom to capture and share written ideas with the whole class (e.g., whiteboards, chart paper, document cameras, etc.). Skillful use of public recording space is important when engaging in teaching practices like the narration. Participants first consider their own use of public recording space. Next, participants analyze examples of the use of public recording spaces in different settings. This activity is followed by participants learning a three-part process for learning from their use of public recording space. This process will be developed over the next several sessions and in the Classroom Connection Activities.

Activities and goals of the session

| Activities | Times | Corresponding parts of the session | Goals |
|--|--------------|---|---|
| Conversation about a CCA from the last session | 10 minutes | | <ul style="list-style-type: none"> Participants will be able to develop fraction comparisons problems that are similar to and problems that are different from given problems and articulate why. |
| I. Preview | 5 minutes | Part 1 | <ul style="list-style-type: none"> Participants will be oriented to the work of the session. |
| II. The importance of attending to public recording space in mathematics teaching | 15 minutes | Part 2 | <ul style="list-style-type: none"> Participants will be able to articulate uses of public recording space and rationales for particular uses. |
| III. Analyzing the use of public recording space | 65 minutes | Parts 3 & 4 | <ul style="list-style-type: none"> Participants will be able to analyze an image of public recording space using mathematics, student thinking, and other lenses. Participants will be able to articulate qualities of public recording space that convey mathematics and support students’ learning. |
| IV. A process for planning for and learning from the use of public recording space | 20 minutes | Part 5 | <ul style="list-style-type: none"> Participants will understand and be ready to use a three-part process for learning from public recording space in their own classrooms. |
| V. Wrap up | 5 minutes | Part 6 | <ul style="list-style-type: none"> Participants will understand ways of connecting the session content to their classroom. |

Classroom Connection Activities

| Required |
|---|
| Type of task: Collection and analysis of public recording space Description: Engage in planning, enacting and analyzing public recording space |
| Type of task: Reading Description: Yoshida (2005) on using blackboard effectively |

Preparing for the session

- Make copies as needed:
 - *Resources:* Handout: Whiteboard images (Part 3); Handout: Blackboard images to analyze (Part 4)
 - *Supplements:* Reading: Using lesson study to develop effective blackboard practices; Handout: Sample board plan (Part 5)
- Customize the Classroom Connection Activities and make copies as needed
- Test technical setups (Internet connection, speakers, projector)

Developing a culture for professional work on mathematics teaching (ongoing work of the facilitator throughout the module)

1. Encourage participation: talking in whole-group discussions; rehearsing teaching practices; coming up to the board as appropriate.
2. Develop habits of speaking and listening: speaking so that others can hear; responding to others' ideas, statements, questions, and teaching practices.
3. Develop norms for talking about teaching practice: close and detailed talk about the practice of teaching; supporting claims with specific examples and evidence; curiosity and interest in other people's thinking; serious engagement with problems of mathematics learning and teaching.
4. Develop norms for mathematical work:
 - a) Reasoning: explaining in detail; probing reasons, ideas, and justifications; expectation that justification is part of the work; attending to others' ideas with interest and respect.
 - b) Representing: building correspondences and making sense of representations, as well as the ways others construct and explain them.
 - c) Carefully using mathematical language.
5. Help participants make connections among module content and develop the sense that this module will be useful in helping them improve their mathematics teaching, their knowledge of mathematics, their understanding of student thinking, and their ability to learning from their own teaching.
6. Help participants understand connections between module content and the Common Core Standards for School Mathematics.

*Scope of the module (focal content of this session in **bold**)*

| Mathematics | Student thinking | Teaching practice | Learning from practice |
|---|--|--|---|
| <ul style="list-style-type: none"> • representing fractions • defining fractions • using and explaining methods and representations for comparing fractions • understanding how equivalence (of fractions) can be represented and used | <ul style="list-style-type: none"> • identifying and analyzing student conceptions, explanations, and representations of fractions • identifying and analyzing student strategies for comparing fractions | <ul style="list-style-type: none"> • selecting and generating representations • connecting representations • narrating the process of representing • supporting students in narrating the use of a representation • recording contributions and emerging mathematical ideas | <ul style="list-style-type: none"> • studying public recording space to learn from practice • using a conceptual framework to guide the planning, use, and analysis of public recording space |

Conversation about a Classroom Connection Activity from the last session (~10 minutes)

| <u>Goals</u> | <u>Instructional sequence</u> | <u>Resources</u> |
|---|--|-------------------------|
| <ul style="list-style-type: none"> Participants will be able to develop fraction comparison problems that are similar to and problems that are different from given problems and articulate why. | <ol style="list-style-type: none"> Participants share fraction comparison problems that they developed and explain why they are similar to the given set. Participants share fraction comparison problems that they developed that are different from the given set. | |

| Detailed description of activity | Comments & other resources | | | | | | | | | | | | | | | | | | |
|---|--|---------------------------|-------------------------|------------------------|----------------|---|----------------|------------------|---|----------------|----------------|--|----------------|------------------|--|----------------|----------------|---|----------------|
| <p>1. Discuss the CCA task that focused on developing fraction comparison problems that are similar to and different from the fraction comparison tasks worked on in Session 5. This type of analysis is useful in everyday mathematics teaching. For example, trying to develop a similar problem for students to practice or purposefully scaling up (or back from) a given problem to support further exploration.</p> <p>Ask a few participants to share a comparison problem that they wrote that is similar to one in the set. Ask participants:</p> <ul style="list-style-type: none"> Which problem is it similar to? Why? <p>Then, ask a few participants to share a fraction comparison problem that they think is different from the problems in the set. Ask participants to explain <i>why</i> the problem is different.</p> | <p><i>For similar fraction comparison problems, participants might suggest fraction comparison problems like the ones shown in the table below.</i></p> <table border="1"> <thead> <tr> <th><i>Comparison Problem</i></th> <th><i>Notable features</i></th> <th><i>Similar problem</i></th> </tr> </thead> <tbody> <tr> <td>$1/5$ or $1/8$</td> <td>Comparing two unit fractions (or perhaps two non-unit fractions that have the same numerator)</td> <td>$1/3$ or $1/5$</td> </tr> <tr> <td>$6/10$ or $7/10$</td> <td>Comparing two fractions with the same denominator</td> <td>$2/7$ or $5/7$</td> </tr> <tr> <td>$5/6$ or $3/4$</td> <td>Comparing two fractions that are both one unit fraction less than a common benchmark such as 1</td> <td>$2/3$ or $7/8$</td> </tr> <tr> <td>$5/6$ or $16/15$</td> <td>One fraction is greater than a common fraction and the second fraction is less than the same benchmark</td> <td>$7/8$ or $4/3$</td> </tr> <tr> <td>$3/3$ or $5/5$</td> <td>The fractions are both representations of 1 whole</td> <td>$4/4$ or $9/9$</td> </tr> </tbody> </table> <p><i>For different fraction comparison problems, participants might suggest fraction comparison tasks like:</i></p> <p>$4/6$ or $3/5$</p> <p>$1/2$ or $2/4$ (equivalent fractions)</p> | <i>Comparison Problem</i> | <i>Notable features</i> | <i>Similar problem</i> | $1/5$ or $1/8$ | Comparing two unit fractions (or perhaps two non-unit fractions that have the same numerator) | $1/3$ or $1/5$ | $6/10$ or $7/10$ | Comparing two fractions with the same denominator | $2/7$ or $5/7$ | $5/6$ or $3/4$ | Comparing two fractions that are both one unit fraction less than a common benchmark such as 1 | $2/3$ or $7/8$ | $5/6$ or $16/15$ | One fraction is greater than a common fraction and the second fraction is less than the same benchmark | $7/8$ or $4/3$ | $3/3$ or $5/5$ | The fractions are both representations of 1 whole | $4/4$ or $9/9$ |
| <i>Comparison Problem</i> | <i>Notable features</i> | <i>Similar problem</i> | | | | | | | | | | | | | | | | | |
| $1/5$ or $1/8$ | Comparing two unit fractions (or perhaps two non-unit fractions that have the same numerator) | $1/3$ or $1/5$ | | | | | | | | | | | | | | | | | |
| $6/10$ or $7/10$ | Comparing two fractions with the same denominator | $2/7$ or $5/7$ | | | | | | | | | | | | | | | | | |
| $5/6$ or $3/4$ | Comparing two fractions that are both one unit fraction less than a common benchmark such as 1 | $2/3$ or $7/8$ | | | | | | | | | | | | | | | | | |
| $5/6$ or $16/15$ | One fraction is greater than a common fraction and the second fraction is less than the same benchmark | $7/8$ or $4/3$ | | | | | | | | | | | | | | | | | |
| $3/3$ or $5/5$ | The fractions are both representations of 1 whole | $4/4$ or $9/9$ | | | | | | | | | | | | | | | | | |

Part 1: Preview (~5 minutes)

| <u>Goals</u> | <u>Instructional sequence</u> | <u>Resources</u> |
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| <ul style="list-style-type: none"> Participants will be oriented to the work of the session. | <ol style="list-style-type: none"> Introduce the session, and watch the video introducing the work. | <ul style="list-style-type: none"> Video (03:31): Overview of session |

| Detailed description of activity | Comments & other resources |
|---|--|
| <p>1. Introduce session: Session 6 focuses on the practice of making use of public recording space (e.g., board, overhead projector, chart paper) during instruction. Participants will work with the images they collected of their use of public recording space to develop an approach to learning about—and improving—this facet of their teaching practice. Attending to the way in which public recording space is used complements other work in this module that focus on using representations in teaching practice, such as connecting and narrating representations. More proficient use of public recording space can support making conceptual connections visible and help students to follow narrations involving the use of representations.</p> <p>Have participants watch the <i>video</i> in which Dr. Ball introduces this work. She explains that the purposes of this session include:</p> <ul style="list-style-type: none"> considering the importance of public recording space in mathematics teaching analyzing the use of public recording space discussing a process for planning for and learning from the use of public recording space | <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="text-align: center;">Overview of Session 6</p> <ul style="list-style-type: none"> Considering the importance of public recording space in mathematics teaching Analyzing the use of public recording space Discussing a process for planning for and learning from the use of public recording space <p style="font-size: 8px; margin-top: 5px;">This work is licensed under a Creative Commons Attribution-NonCommercial-4.0 International License. https://creativecommons.org/licenses/by-nc/4.0/ © 2018 Mathematics Teaching and Learning to Teach School of Education • University of Michigan • Ann Arbor, MI 48109-1259 • mtlt@umich.edu</p> </div> <p><i>This session is the first place in the module where participants explicitly encounter the practice of using public recording space to represent mathematics. You can support participants in viewing the work on public recording space as a natural progression in their work on other practices in the module. Public recording space is often involved when teachers connect and narrate mathematical ideas. In addition, using public recording space well often involves the work teachers do to help students represent ideas, explain how those representations are used, and to see connections.</i></p> <p><i>The work on public recording space in this session illustrates work on fraction content and so work on this practice serves as another opportunity to meaningfully encounter content through teaching.</i></p> |

Part 2: The importance of attending to public recording space in mathematics teaching (~15 minutes)

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|---|---|---|
| <p><u>Goals</u></p> <ul style="list-style-type: none"> Participants will be able to articulate uses of public recording space and rationales for particular uses. | <p><u>Instructional sequence</u></p> <ol style="list-style-type: none"> Introduce Part 1 and watch the video in which Dr. Ball introduces the idea of using public recording space. Read the slide and have participants consider their current use of public recording space using the focus questions. | <p><u>Resources</u></p> <ul style="list-style-type: none"> Video (03:09): Using public recording space <p><u>Supplements</u></p> <ul style="list-style-type: none"> Reading: Using lesson study to develop effective blackboard practices (Yoshida, 2005) |
|---|---|---|

| Detailed description of activity | Comments & other resources |
|---|---|
| <p>1. Introduce Part 2: In this module, the phrase “public recording space” refers to the collection of “technologies” and spaces that can be used in the classroom to capture and share written ideas with the whole class, including boards of various kinds (black, white, SMART), chart paper, the overhead projector, document cameras, etc. Since each of these have different strengths and weaknesses, teachers often use particular tools for certain purposes or use them in combination.</p> <p>Have participants watch the <i>video</i> in which Dr. Ball introduces the idea of using public recording space.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p style="text-align: center; background-color: #1a3d4d; color: white; padding: 2px;">Using public recording space</p> <ul style="list-style-type: none"> An idea imported from the practice of Japanese teachers “Bansho”: the study of blackboard use “Public recording space”: whiteboard, chalkboard, pre-made posters, chart paper during class Principles for use of the board and connecting this to students’ opportunities to learn mathematics <p style="font-size: 8px; margin-top: 5px;">This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License. https://creativecommons.org/licenses/by-nc/4.0/ © 2018 Mathematics Teaching and Learning to Teach School of Education • University of Michigan • Ann Arbor, MI 48109-1259 • mtlt@umich.edu</p> </div> | <p><i>It is important to clarify for participants that while public recording space can include multiple modes of representation including writing on the whiteboard, overhead, and chart paper, participants will study ONE mode of representation that they use in lessons (not every single one used in a lesson).</i></p> |

| Detailed description of activity | Comments & other resources |
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| <p>2. Have participants read the slide and then discuss the following questions as a group:</p> <ul style="list-style-type: none"> • What media do you use to make public records in your classroom? What are the advantages and disadvantages of each? • What do you typically record during class? What recordings, if any, do you save for later use? • To what extent do you have students record written ideas during class? What sorts of things do they record? How do you decide when you record and when students record? | <div data-bbox="709 305 1087 597" style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="text-align: center;">Why attend to public recording space in mathematics teaching?</p> <p>Teachers can use public recording space in classrooms to:</p> <ul style="list-style-type: none"> • Make the use of representations more effective • Capture ideas across a lesson to make it possible for students to remember and revisit what has been discussed • Model mathematical practices and the use of language • Connect ideas and summarize lessons • Make records from a lesson for subsequent use in later work <p style="text-align: center;"><small>(ideas adapted from work of Makoto Yoshida)</small></p> </div> <p><i>A more extensive description of why public recording space is important in teaching is found in the chapter written by Yoshida that participants will read as part of their Classroom Connection Activities assignment. (This reading can be found in the Session 6 Planner).</i></p> <p><i>As part of the Session 5 Classroom Connection Activities, participants took photos of their use of public recording space. Encourage participants to use the photos as the basis for responding to the focal questions.</i></p> <p><i>Make sure to establish that all media have strengths and weaknesses. For instance, document cameras allow the class to see a work from a student's paper without the student needing to recreate it, however, the work can't be displayed long term using this method. Teachers often use particular tools for certain purposes or use them in combination.</i></p> |

Part 3: Considerations for recording in public space (~25 minutes)

| <u>Goals</u> | <u>Instructional sequence</u> | <u>Resources</u> |
|---|---|---|
| <ul style="list-style-type: none"> Participants will be able to analyze an image of public recording space using mathematics, student thinking, and other lenses. Participants will be able to articulate qualities of public recording space that convey mathematics and support students' learning. | <ol style="list-style-type: none"> Compare two images of public recording space. Watch <i>Videos A - E</i>. | <ul style="list-style-type: none"> Handout: Whiteboard images Video A (00:39): Writing the problem that is the focus of the recording Video B (00:35): Assigning places to record, comment 1 Video C (01:04): Assigning places to record, comment 2 Video D (00:32): Labeling the work, comment 1 Video E (01:02): Labeling the work, comment 2 <p><u>Supplements</u></p> <ul style="list-style-type: none"> Video F (02:32): Making posters ahead of time Video G (00:28): No conclusion evident; no timing Video H (00:29): Strategic use of color |

| Detailed description of activity | Comments & other resources |
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| <p>1. Introduce Part 3: Like any teaching practice, recording in public space can be done more or less effectively. In this part of the session, participants will identify qualities of recording in public space that help make it more effective. Attending to these qualities can help participants plan the use of public recording space in their teaching, provide things to keep in mind during instruction, and frame their reflection and goal setting.</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>Image 1: I want to share 3 bottles of soda equally among 4 people. How much will each person get? (also referred to as "the one from two weeks ago")</p> </div> <div style="text-align: center;"> <p>Image 2: Compare $\frac{3}{5}$ and $\frac{5}{8}$</p> </div> </div> <p>Distribute <i>Handout: Whiteboard images</i>.</p> | <p><i>Qualities that participants might note include:</i></p> <ul style="list-style-type: none"> <i>Image 1 is not very precise. Image 2 is much more precise.</i> <i>Image 2 involves color coding, though the key is not shown.</i> <i>The task is shown in Image 2, but not in Image 1.</i> <p><i>A slide of Image 2 can be found through the resource link "Slide: Compare 3/5 and 5/8."</i></p> <p><i>If the images are discussed in whole group, it may be useful to click on the slide being discussed in order to move to the full-screen viewing format.</i></p> |

| Detailed description of activity | Comments & other resources |
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| <p>Introduce the task: With a partner, have participants compare the images shown.</p> <ul style="list-style-type: none"> Image 1 was created in response to the task, "I want to share 3 bottles of soda equally among 4 people. How much will each person get?" Image 2 was created in response to the task, "Compare $\frac{3}{5}$ and $\frac{5}{8}$". <p>As pairs compare the images, they should:</p> <ul style="list-style-type: none"> List the qualities they are attending to when they notice differences in the recordings. <p>Consider the importance of these qualities for conveying mathematics and for supporting student learning.</p> | <p><i>Participants will continue to revise and add to this list throughout the session.</i></p> |
| <p>2. Have participants watch selected videos (<i>Videos A – E</i>) in which teachers in the professional development course discuss things to think about when you are organizing public recording space. Videos should be selected based upon the issues you think might be useful to discuss with your participants. As participants watch, they should:</p> <ul style="list-style-type: none"> Consider how the qualities discussed in the clip relate to the qualities participants have already recorded. Add any new ideas to their list of qualities. <p>As time permits, have participants share in whole group some of the ideas on their lists and why they think these qualities are important for conveying mathematics and for supporting student learning.</p> | <ul style="list-style-type: none"> Video A: Including the problem that is the focus of the recording Video B: Assigning places to record, comment 1 Video C: Assigning places to record, comment 2 Video D: Labeling the work, comment 1 Video E: Labeling the work, comment 2 <p>These are supplemental videos:</p> <ul style="list-style-type: none"> Video F: Making posters ahead of time Video G: No conclusion evident Video H: Strategic use of color |

Part 4: Analyzing images of public recording space (~40 minutes)

Goals

- Participants will be able to analyze an image of public recording space using mathematics, student thinking, and other lenses.
- Participants will be able to articulate qualities of public recording spaces that convey mathematics and support students' learning.

Instructional sequence

1. Introduce Part 4 and the task of analyzing blackboard images from a fifth-grade lesson.
2. Revise working lists from Part 3.
3. Watch Video A in which comments on the usefulness of photos in learning from teaching.
4. Watch and discuss selected videos (Videos B – E).

Resources

- Handout: Blackboard images to analyze
- Video A (01:28): Additional ideas
- Video B (02:19): Using the board to support student learning
- Video C (00:45): Something to be cautious about when recording
- Video D (00:57): Recording the day's goal
- Video E (02:29): Deciding what to erase and what to save

| Detailed description of activity | Comments & other resources |
|--|---|
| <p>1. Introduce Part 4: In this part, participants will continue their consideration of recording in public space by examining images from classroom teaching.</p> <p>Introduce the task of analyzing images of the public recording space.</p> <div style="display: flex; justify-content: space-around;"> <div data-bbox="226 870 611 1159"> <p style="text-align: center;">Analyzing images from teaching</p> <p>Consider these questions as you examine images of public recording space in a classroom:</p> <ul style="list-style-type: none"> • What sorts of things are recorded? • Who records? What proportions of the recording are done by the teacher and by students? • What seems to be the mathematical focus of class work? • What seems to be the purpose of the class work? Can you tell from the image? Why or why not? • What else stands out to you when you examine the image(s)? </div> <div data-bbox="634 870 1018 1159"> <p style="text-align: center;">Analyzing images from teaching</p> </div> </div> <p>Distribute <i>Handout: Blackboard images to analyze</i>.</p> <p>Introduce task: Work with a partner to use the questions on the slide to analyze the blackboard images from a fifth-grade lesson on comparing fractions (see Slide: Analyzing images from teaching). Encourage participants to support their responses to the questions with evidence from the image.</p> | <p><i>The purpose of this task is to focus on what can be learned from a record of practice like an image of public recording space. For example, unpacking what is represented on a public recording space at the end of a lesson can help participants develop ideas about how to enhance the ways in which mathematics is represented or think about the proportion of time they are recording on the board compared to the amount that students record.</i></p> <p><i>Emphasize that this set of questions foreshadows the questions that participants will use in the process of planning for and learning from public recording space.</i></p> <p><i>Encourage participants to use evidence from the image in their analyses. This will not only make their analyses richer in the moment, but it will also provide them with a way of looking at images that they can use later to learn from images of their own teaching or those of a colleague.</i></p> <p><i>Caution: It is best not to provide participants much context for the images that are being used beyond the fact that they came from a fifth-grade lesson on comparing fractions. Providing more information than this will impact participants' opportunities to observe and ask questions about the images.</i></p> |

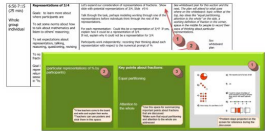
| Detailed description of activity | Comments & other resources |
|----------------------------------|--|
| | <p><i>Participants may or may not notice the following:</i></p> <ul style="list-style-type: none"> • <i>What sorts of things are recorded?</i> <ul style="list-style-type: none"> ○ <i>The list of representations used and not used.</i> ○ <i>The class's conclusions/findings.</i> ○ <i>An extension problem.</i> • <i>Who records? What proportions of the recording are done by the teacher and by students?</i> <ul style="list-style-type: none"> ○ <i>The majority of the writing is done by the teacher.</i> • <i>What seems to be the mathematical focus of class work?</i> <ul style="list-style-type: none"> ○ <i>Comparing fractions using different methods.</i> • <i>What seems to be the purpose of the class work? Can you tell from the image? Why or why not?</i> <ul style="list-style-type: none"> ○ <i>The list of representations may indicate that one purpose of the class work was to determine which representations of fractions would be most helpful to use when comparing fractions.</i> ○ <i>The list of findings on the board implies that one purpose of the class work was to help students understand traits of fractions that could be used to support the comparison of two fractions.</i> • <i>What else stands out to you when you examine the image(s)?</i> <ul style="list-style-type: none"> ○ <i>Some of the diagrams are not clearly labeled.</i> ○ <i>There is a lot of writing on the board—maybe too much.</i> ○ <i>There are errors on the board:</i> <ul style="list-style-type: none"> ▪ <i>In the double number line figure, the unit interval in second number line from 0 to 1 is divided into sixteenths rather than sixteenths and so the point is not correctly labeled.</i> ▪ <i>In the area model figure, the wholes for the two fractions being compared differ in size (and thus, the drawings cannot be used easily to compare the fractions).</i> |

| Detailed description of activity | Comments & other resources |
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| <p>2. Have partners look back at the list of qualities for recording in public space that they began in part 3. They should revise or add to their working list based on their discussions of the images.</p> | |
| <p>3. Have participants watch <i>Video A</i> in which Dr. Ball frames the ideas participants will have a chance to explore and comments on the usefulness of photos in learning from teaching.</p> | <p><i>It is likely that participants will be more familiar with the use of video in the study of teaching, but there are other records that can also be used for learning about teaching. There are many advantages of using still visual images in studying teaching, some of which are shared in the video. An additional example is that the equipment needed is very widely available and easy to use. They document important aspects of practice with very little time investment. The use of visual images also has advantages for you as a facilitator. For instance, pictures are relatively easy to save and share when compared with the technology and time needed to work with video or even making scans of student work.</i></p> |

| Detailed description of activity | Comments & other resources |
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| <p>4. Have participants watch additional video clips (<i>Videos B – E</i>) in which the teachers in the professional development course comment on the use of public recording space. Choose video clips based upon the needs and interests of the group. As participants watch each clip, they should consider the focus question for that particular video clips.</p> <ul style="list-style-type: none"> • Video B: How do the components mentioned support student learning of mathematics? • Video C: How could a teacher record in ways that would avoid this potential problem? • Video D: What might be a drawback to including this component in your recording? • Video E: What sorts of recordings do you save to use later? How do you decide? <p>After each clip, have participants discuss the focus question with a partner or in whole group.</p> | <p><i>Video B: How do the components mentioned support student learning of mathematics?</i> <i>Possible response: In addition to some of the advantages for motivation and management mentioned in the video, being explicit about lesson topics and conclusions provides children with additional access to focal mathematical ideas.</i></p> <p><i>Video C: How could a teacher record in ways that would avoid this potential problem?</i> <i>Possible response: There are many pieces of information on the board and even the labeling of the sections might not help students keep things straight. One dimension that this picture does not show is when the board was written on during the lesson. The teacher may have ways of talking that could clarify the content on board over time. Another option could be to record some things on the chalkboard and other things, like conclusions, in a different public space.</i></p> <p><i>Video D: What might be a drawback to including this component in your recording?</i> <i>Possible response: In some lessons you might want students to be working inductively toward the big idea. Listing the objective on the board might undermine or limit that possibility.</i></p> <p><i>Video E: What sorts of recordings do you save to use later? How do you decide?</i> <i>Possible response: Solutions to problems in multiday lessons, lists of prior knowledge, ideas that you want to evolve over time, commonly used strategies.</i></p> |

Part 5: A process for planning for and learning from the use of public recording space (~20 minutes)

| <u>Goals</u> | <u>Instructional sequence</u> | <u>Resources</u> |
|---|--|---|
| <ul style="list-style-type: none"> Participants will understand and be ready to use a three-part process for learning from public recording space in their own classrooms. | <ol style="list-style-type: none"> Introduce Part 6 and read the two slides which describe the three parts of the process. Watch the video in which Dr. Ball elaborates the process. | <ul style="list-style-type: none"> Video (02:18): Introducing a process <p><u>Supplements</u></p> <ul style="list-style-type: none"> Handout: Sample board plan (Session 6) |

| Detailed description of activity | Comments & other resources |
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| <p>1. Introduce Part 6: While teachers learn from their practice all the time, there are ways of engaging in and reflecting on teaching that can enhance learning and improve subsequent instruction. This part of the session outlines a three-part process to learning about your recording within the public space of the classroom. It is a process for learning from—and improving—teaching that can be integrated with your everyday work. The process focuses on:</p> <ul style="list-style-type: none"> the use of representations in teaching encouraging and noticing student participation in learning attending to the mathematics available for learning <div style="display: flex; justify-content: space-around;"> <div data-bbox="235 917 619 1205" style="border: 1px solid black; padding: 5px;"> <p style="background-color: #003366; color: white; padding: 2px; text-align: center;">Planning for and learning from the use of public recording space</p> <p>Main parts of the process we will use:</p> <ul style="list-style-type: none"> Develop a plan for public recording space that is linked to steps of a lesson plan  </div> <div data-bbox="714 917 1098 1205" style="border: 1px solid black; padding: 5px;"> <p style="background-color: #003366; color: white; padding: 2px; text-align: center;">Planning for and learning from the use of public recording space</p> <p>The rest of the process:</p> <ul style="list-style-type: none"> Enact the plan by encouraging students to represent and connect representations, and using what is recorded on the board or on chart paper in summarizing the lesson Reflect on the use of public space: representation of content, alignment with purpose, engagement of students, organization, and clarity </div> </div> | <p><i>The Classroom Connection Activities describe more about the process that participants will engage in and includes examples of its components.</i></p> |

| Detailed description of activity | Comments & other resources |
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| <p>2. Have participants watch the <i>video</i> in which Dr. Ball elaborates the three parts of the process:</p> <ol style="list-style-type: none"> 1. Develop a plan for public recording linked to your lesson plan; 2. Enact your plan and capture images of public recording space; and 3. Reflect on your use of public recording space using records of practice. <p>Elicit comments and/or questions about the process.</p> | <p><i>To see a small example of a plan for public recording, see the supplements (Handout: Sample board plan (Session 6))</i></p> <p><i>This is just meant to be a brief introduction to the process. Participants will have opportunities to practice the process throughout the rest of the module, starting with the upcoming Classroom Connection Activities.</i></p> <p><i>Pause the video around 00:45 to tell participants that they are not expected to produce a plan like the one shown on the slide. Instead, participants should use their typical plan and add a few notes about how they will use board space.</i></p> |
| <p>3. Have participants share their experience taking photos for the CCA by discussing the following questions:</p> <ul style="list-style-type: none"> • What did you learn from the photos about your use of public recording space during a mathematics lesson? • Are there particular techniques or arrangements that you made that were useful in taking photos? Which techniques or arrangements were less useful? <p>The word “arrangements” is a way to invite the sharing of other supports that might make taking the pictures more manageable or productive (e.g. having a student take the photos, leaving the board as is until a prep time, writing using a particular kind of marker, using chart paper that could be put on the wall and would not be “in the way” of recording that is needed for ongoing lessons)</p> <p>It is important the participants leave this part of the session knowing that taking photos is a fundamental part of this method of learning from one’s own practice and that they understand how to take photos in ways that will allow them to learn from their practice.</p> | <p><i>If these points are not raised by participants, consider raising the following points:</i></p> <ul style="list-style-type: none"> • <i>Make sure to take at least one photo that captures the entire public recording space. If it is hard to read information in this photo, take additional photos that capture smaller sections of the public recording space.</i> • <i>Lighting conditions can affect the photos. Try adjusting light in the room (i.e., pull down window shades) to reduce glare and improve the quality of the photos.</i> • <i>If annotations are necessary to support others in understanding what is in the photo, make it easy for viewers to distinguish those labels or other annotations from what was recorded in public space during the lesson.</i> • <i>To facilitate sharing of images, use a digital camera.</i> |

Part 6: Wrap up (~5 minutes)

| <u>Goals</u> | <u>Instructional sequence</u> | <u>Resources</u> |
|---|--|---|
| <ul style="list-style-type: none"> Participants will understand ways of connecting the session content to their classroom. | <ol style="list-style-type: none"> Watch the video. Explain the Classroom Connection Activities. | <ul style="list-style-type: none"> Video (01:43): Introduction to the learning from public recording space classroom connection activity |

| Detailed description of activity | Comments & other resources |
|--|---|
| <p>1. Have participants watch the <i>video</i> in which Dr. Ball introduces a process for learning from public recording space that is a part of the Classroom Connection Activities.</p> <div data-bbox="655 548 1041 836" style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;">Summary</p> <p>In this session, you:</p> <ul style="list-style-type: none"> Considered the importance of attending to public recording space in mathematics teaching Analyzed records made in public recording spaces in order to begin to develop principles for the use of public recording space in your teaching Began to explore a process for learning from the use of public recording spaces <ol style="list-style-type: none"> Develop a plan for public recording linked to your lesson plan Enact your plan and capture images of public space Reflect on your use of public recording space drawing upon records of practice <p><small>This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License. https://creativecommons.org/licenses/by-nc/4.0/ © 2018 Mathematics Teaching and Learning to Teach School of Education • University of Michigan • Ann Arbor, MI 48109-1259 • mtlt@umich.edu 10</small></p> </div> | |
| <p>2. Distribute the <i>handout</i> you customized with the Classroom Connection Activities and accompanying documents described in the following table.</p> <p><u>Required:</u></p> <ul style="list-style-type: none"> Planning for and learning from the use of public recording space Yoshida (2005) reading on using the blackboard effectively | <p><i>The records and responses participants generate in response to the first activity are the basis for a substantial portion of Session 7. It is essential to establish a way for participants to have their responses and records available at the next session. If you have been having participants upload their responses and materials, you will need to be sure you have ways to access them during Session 7. If not, then you will need to be sure your participants physically bring their responses and all the materials they collected to Session 7.</i></p> <p><i>Remind participants that CCAs related to teaching practices, like the collection and analysis of public recording space, can be done with whatever mathematics is currently being taught. In other words, it is not necessary to be teaching fractions to be engaging with the teaching practices in one's own classroom.</i></p> |